

Claims

1. A solids separator including:
 - an elongate tubular housing rotatable around a central axis;
 - 5 a fluid inlet at one end of said housing adapted to receive a flow of a fluid including entrained solids;
 - a first and a second outlet at the opposing end of said housing, wherein, said rotatable housing is effective in imparting a radially outward force to the entrained solids flowing through the separator whereby the solids are
 - 10 concentrated at the peripheral portion of the cross-section of the flow at the first and second outlets and wherein the first outlet is adapted to receive the inner portion of the cross-section of the flow and the second outlet is adapted to receive the peripheral portion of the cross-section of the flow containing the concentrated solids, and wherein the solids separator
 - 15 includes a swirl inducing means coupled to the rotatable housing, wherein said swirl inducing means aids in imparting the radially outward force to the entrained solids.
2. A solids separator according to claim 1 wherein the first and second outlets are defined by a tubular separator longitudinally mounted within the rotatable housing whereby the second outlet is defined between the tubular separator and the rotatable housing and the first outlet is defined through the tubular separator.

3. A solids separator according to claim 1 or claim 2 wherein the tubular separator is rotatable and rotates at the same revolutions per minute as the rotatable housing.
4. A solids separator according to claim 1 or claim 2 wherein the tubular separator rotates faster or slower than the rotatable housing.
5. A solids separator according to claim 1 wherein the swirl inducing means consists of an impeller and is located before the rotatable housing.
- 10 6. A solids separator according to claim 1 wherein the swirl inducing means rotates at the same revolutions per minute as the rotatable housing.
7. A solids separator according to claim 1 wherein the solids separator includes a self pumping means coupled to the rotatable housing, wherein the self pumping means aids in drawing the fluid through the solids separator.
- 15 8. A solids separator according to claim 7 wherein the self pumping means consists of an impeller and is located at the outlet of the rotatable housing.
- 20 9. A solids separator according to claim 7 or 8 wherein the self pumping means rotates at the same revolutions per minute as the rotatable housing.
10. A solids separator according to claim 1 wherein the angular velocity of the fluid at

the peripheral portion of the cross-section of the flow is substantially the same as the angular velocity of the rotatable housing.

11. A solids separator according to claim 1 wherein the rotatable housing rotates at 5 between 500 and 5000 revolutions per minute, preferably the rotatable housing rotates at between 600 and 3000 revolutions per minute and more preferably the rotatable housing rotates at between 800 and 1500 revolutions per minute.
12. A solids separator according to claim 1 wherein the solids separator is orientated in 10 a substantially vertical arrangement and more preferably the fluid inlet is located at the base of said arrangement.
13. A solids separator according to claim 1 wherein the flow rate of the fluid through 15 the separator is such that there is minimal turbulence within the separator and more preferably the fluid flows through in a substantially laminar fashion.
14. A solids separator according to claim 1 wherein the solids separator includes 20 radially extending guide vanes mounted within the rotatable housing, wherein said guide vanes aid in maintaining the angular velocity of the fluid and/or provide structural support to the solids separator.
15. A solids separator according to claim 1 wherein the solids separator includes a central shaft extending through the rotatable housing wherein the shaft does not

allow fluid to travel on the central axis through the separator and/or provides structural support to the solids separator.

16. A solids separator according to claim 1 wherein the solids separator includes an external housing which encloses the rotatable housing.
17. A solids separator including:
 - an elongate tubular outer housing rotatable around a central axis;
 - an elongate tubular inner housing also rotatable around the central axis and longitudinally mounted within the outer housing thereby defining a passage of flow between the outer and inner housings;
 - a fluid inlet at one end of the passage of flow and adapted to receive a flow of a fluid including entrained solids;
 - a first and a second outlet at the opposing end of the passage of flow, wherein, the rotatable outer and inner housings are effective in imparting a radially outward force to the entrained solids flowing through the passage of flow whereby the solids are concentrated at the peripheral portion of the cross-section of the flow at the first and second outlets and wherein the first outlet is adapted to receive the inner portion of the cross-section of the flow and the second outlet is adapted to receive the peripheral portion of the cross-section of the flow containing the concentrated solids, and wherein the solids separator includes a swirl inducing means, wherein said swirl inducing means aids in imparting the radially outward force to the entrained solids.

18. A solids separator according to claim 17 wherein the outer housing rotates at the same revolutions per minute as the inner housing.
- 5 19. A solids separator according to claim 17 wherein the first and second outlets are defined by a tubular separator longitudinally mounted between the outer housing and the inner housing whereby the second outlet is defined between the tubular separator and the outer housing and the first outlet is defined between the tubular separator and the inner housing.
- 10 20. A solids separator according to claim 19 wherein the tubular separator is rotatable and rotates at the same revolutions per minute as either the outer housing or the inner housing.
- 15 21. A solids separator according to claim 17 wherein the swirl inducing means is an impeller located on the outer surface of an inverted bell, the outermost circumference of which is coupled to the circumferential edge of the inner housing near the inlet of the passage of flow.
- 20 22. A solids separator according to claim 21 wherein the impeller also acts as a self pumping means for pumping the fluid into the passage of flow.
23. A solids separator according to claim 17 wherein the angular velocity of the fluid at

the peripheral portion of the cross-section of the flow is substantially the same as the angular velocity of the outer housing.

24. A solids separator according to claim 17 wherein the outer and inner rotatable housing rotate at between 500 and 5000 revolutions per minute, preferably at between 600 and 3000 revolutions per minute and more preferably the at between 800 and 1500 revolutions per minute.
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25. A solids separator according to claim 17 wherein the solids separator is orientated in a substantially vertical arrangement and more preferably the fluid inlet is located at the base of said arrangement.
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26. A solids separator according to claim 17 wherein the flow rate of the fluid through the separator is such that there is minimal turbulence within the separator and more preferably the fluid flows through in a substantially laminar fashion.
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27. A solids separator according to claim 17 wherein the solids separator includes a central shaft extending through the inner rotatable housing wherein the shaft provides structural support to the solids separator.
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28. A solids separator according to claim 17 wherein the solids separator includes an external housing which encloses the outer rotating housing.

29. A solids separator according to claim 1 or claim 17 wherein the fluid is a liquid such as liquid waste, and the solids are particles present in a sewage stream.

30. A solids separator according to claim 1 or claim 17 wherein the solids separator is used in place of a clarifier or a sedimentation pond or in place of, or prior to, any unit operations which are limited by the sedimentation rate of solids.

31. A solids separator according to claim 1 or 17 wherein the solids separator may be used to reduce the solids flux load to a clarifier operating in a biological effluent treatment facility.